Docket No. 238551US2CONT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Masahiko SATOH GAU:

SERIAL NO: New Application EXAMINER:

FILED: Herewith

FOR: FIXING APPARATUS AND IMAGE-FORMING DEVICE

REQUEST FOR PRIORITY

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

■ Full benefit of the filing date of U.S. Application Serial Number 10/159,102, filed June 3, 2002, is claimed pursuant to the provisions of **35 U.S.C. §120**.

☐ Full benefit of the filing date(s) of U.S. Provisional Application(s) is claimed pursuant to the provisions of **35 U.S.C. §119(e)**: **Application No.** **Date Filed**

■ Applicants claim any right to priority from any earlier filed applications to which they may be entitled pursuant to the provisions of **35 U.S.C. §119**, as noted below.

In the matter of the above-identified application for patent, notice is hereby given that the applicants claim as priority:

COUNTRY	APPLICATION NUMBER	MONTH/DAY/YEAR
Japan	2001-168335	June 4, 2001
Japan	2001-191709	June 25, 2001
Japan	2002-131238	May 7, 2002

Certified copies of the corresponding Convention Application(s)

- ☐ are submitted herewith
- ☐ will be submitted prior to payment of the Final Fee
- ■ were filed in prior application Serial No. 10/159,102 filed June 3, 2002
- ☐ were submitted to the International Bureau in PCT Application Number
  Receipt of the certified copies by the International Bureau in a timely manner under PCT Rule 17.1(a) has been acknowledged as evidenced by the attached PCT/IB/304.
- ☐ (A) Application Serial No.(s) were filed in prior application Serial No. filed ; and
- ☐ (B) Application Serial No.(s)
  - ☐ are submitted herewith
  - ☐ will be submitted prior to payment of the Final Fee

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Gregory J. Maier
Registration No. 25,599

Akihiro Yamazaki
Registration No. 46,155

22850

Tel. (703) 413-3000
Fax. (703) 413-2220
(OSMMN 05/03)

Trek Application Note Number 1005

Surface Resistivity and Surface Resistance Measurements
Using a Concentric Ring Probe Technique

William A. Maryniak, Toshio Uehara, Maciej A. Noras

Abstract The relationship between surface resistivity and surface resistance is established and explained.

1 Introduction

Concepts of surface resistance and surface resistivity can be sometimes confusing. Definitions of both terms can be found in many books and standards [1–4]. Surface resistance, R_s, is defined in all of the aforementioned literature sources as the ratio of a DC voltage U to the current, I_s flowing between two electrodes of specified configuration that are in contact with the same side of a material under test (Figure 1).

$$R_s = \frac{U}{I_s} \quad (1)$$

Surface resistivity ρ_s, on the other hand, is determined by the ratio of DC voltage U drop per unit length L to the surface current I_s per unit width D.

$$\rho_s = \frac{\frac{U}{L}}{\frac{I_s}{D}} \quad (2)$$

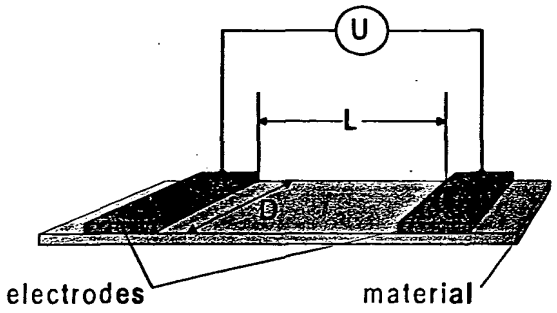

Figure 1: Basic setup for surface resistance and surface resistivity measurement.

Surface resistivity is a property of a material. Theoretically it should remain constant regardless of the method and configuration of the electrodes used for the surface resistivity measurement. A result of the surface resistance measurement depends on both the material and the geometry of the electrodes used in the measurement. The physical unit of surface resistivity is Ohm (Ω). The legitimate unit of the surface resistance is also Ohm. Because of that surface resistivity and the surface resistance are often mixed up. In order to differentiate between the two, surface resistivity is often expressed also in Ohm/square (Ω/sq.) which is not a valid unit from the dimensional analysis point of view.

2 Surface resistivity and surface resistance

2.1 Current density and surface current density

It is possible to establish a relationship between the surface resistance and surface resistivity for any electrode configuration. An idea of the current density is very helpful in understanding of that relationship. Consider two samples of a material as shown in Figure 2. With a constant voltage U and both samples made of the same material the amount of current flowing through the material will be different. The thicker bar (sample #1) conducts "more easily" than the thin bar (sample #2). One may use a water pipe analogy - given a constant water pressure, there will be more water per unit time coming through the pipe with a larger diameter. The flow density, be it water or electric current, is the amount of flow passing through a unit area of the pipe or the sample of the material. The surface area is perpendicular to the direction of the flowing current (or water).

TREK, INC. • 11601 Maple Ridge Road • Medina, NY 14103 • Tel: (585) 798-3140
Call: 1 800 FOR TREK • FAX: (585) 798-3106 • E-mail: sales@trekinc.com • Web: www.trekinc.com

ELECTRICAL TESTING

Dielectric Strength ASTM D 149 (IEC 243-1) Dielectric strength reflects the electric strength of insulating materials at power frequencies (48 Hz to 62 Hz), or the measure of dielectric breakdown resistance of a material under an applied voltage. The applied voltage just before breakdown is divided by the specimen thickness to give the value in kV/mm. The surrounding medium can be air or oil. The thickness dependence can be significant; all values are reported at specimen thickness.

Many factors influence the values:

- Thickness, homogeneity and moisture content of the test specimen
- Dimensions and thermal conductivity of the test electrodes
- Frequency and wave form of the applied voltage
- Ambient temperature, pressure and humidity
- Electrical and thermal characteristics of the ambient medium

Surface Resistivity ASTM D 257 (IEC 93)

When an insulating plastic is subjected to a voltage, some portion of the resultant current will flow along the surface of the plastic molding if there is another conductor or ground attached to the same surface. Surface resistivity is a measure of the ability to resist that surface current. It is measured as the resistance when a direct voltage is applied between surface mounted electrodes of unit width and unit spacing. Reported in Ohm - sometimes called ohms per square.

Volume Resistivity ASTM D 257 (IEC 93)

PERFORMANCE TESTING METHODS

- Mechanical Testing
- Hardness Testing
- Impact Testing
- Flammability Testing
- Thermal Testing
- Electrical Testing
- Optical Testing
- Physical Testing

GE Plastics Live

GE Live
Click here to speak LIVE to an engineer.

NEW APPLICATION ?

Let us help you with your new application.